

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT ID CODE		PAGE OF PAGES 1 7	
2. AMENDMENT/MODIFICATION NO. 000002		3. EFFECTIVE DATE 05/17/2012		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
6. ISSUED BY NASA/John F. Kennedy Space Center Office of Procurement MAIL CODE OP-MS/Chelsea Poling KENNEDY SPACE CENTER FL 32899		CODE KSC		7. ADMINISTERED BY (If other than Item 6) NASA/Kennedy Space Center Office of Procurement MAIL CODE OP KENNEDY SPACE CENTER FL 32899		CODE KSC	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x) 9A. AMENDMENT OF SOLICITATION NO. NNK12427490R			
				x 9B. DATED (SEE ITEM 11) 04/18/2012			
				10A. MODIFICATION OF CONTRACT/ORDER NO.			
				10B. DATED (SEE ITEM 13)			
CODE		FACILITY CODE					
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>							
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)							
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>							
CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).						
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
	D. OTHER (Specify type of modification and authority)						
<b>E. IMPORTANT:</b> Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) The purpose of this amendment is to revise the Deliverable Items List and Schedule (DILS) and to document answers provided to questions received.  See attached slip sheets: DILS Revision 1 and Question/Answer Chart.  The proposal due date submission is not extended. All other terms and conditions remain the same.							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)				_____ (Signature of Contracting Officer)			

# **NNK12427240R -- ATTACHMENT C- REV. 1**

## **VDU GC-MS: DELIVERABLE ITEMS LIST AND SCHEDULE (DILS)**

**10-May-12**

Item #	Description	Reference	Quantity	Delivery Date
1	Status report by weekly telecon	SOW 2.2.1	95 each	Weekly
2	Written Monthly Status Report	SOW 2.2.2	24 each	Monthly
	Proposed project plan identifying tasks, milestones, and resources needed to meet major milestones	SOW 2.1	1	2 weeks after contract award
3	Updated design phase project plan identifying tasks, milestones, and resources needed to meet major milestones	SOW 2.4.4	1	PDR
4	Mechanical drawings, Pro-E compatible drawings of all components and integrated instrument	SOW 2.8	1	CDR
5	Electrical design drawings	SOW 2.8		CDR
6	Documentation of analysis supporting verification of design requirements to include methodology/process and data/results	SOW 3.2-3.5	1	NLT 23 months after ATP
7	A complete Bill of Materials of all components specified in the design of the system. As a minimum, the Bill of Materials shall provide the item description, manufacturer's part number, lead time for procurement, supplier, supplier's part number, and component designator (if	SOW 2.5.1	1	NLT 23 months after ATP
8	Final report to include design choices, justification for design choices, data collected during testing/evaluation of components, and options considered during the design phase	SOW 2.4.3.2	1	CDR
9	Preliminary Design Review Presentation Package	SOW 2.4.1.2	1	7 days before PDR
10	Preferred system solutions including major tradeoffs and options	SOW 2.4.1.2	1	PDR
11	Preliminary functional baseline with trade off analysis	SOW 2.4.1.2	1	PDR
12	Preliminary system software functional requirements	SOW 2.4.1.2		PDR
13	Preliminary risk assessment/mitigation plan and safety analysis	SOW 2.4.1.2	1	PDR
14	Preliminary test plan for validation and verification of all technical requirements (Section 3.2) for LAVA GC-MS	SOW 2.4.1.2	1	PDR
15	Preliminary interface control document	SOW 2.4.1.2	1	PDR
16	Updated schedule data	SOW 2.4.1.2	1	PDR
17	Preliminary limited life items list	SOW 2.4.1.2	1	PDR
18	Preliminary subsystem design specifications for hardware and software	SOW 2.4.1.2	1	PDR
19	Preliminary mass and power estimates to include basis of estimation (includes a comparison of estimates to requirements and plan to control growth and meet requirements and design matures)	SOW 2.4.1.2	1	PDR
20	Preliminary technical plan for high and low level water detection, testing, and optimization of system for water analysis	SOW 2.4.1.2	1	PDR
21	Preliminary technical plan for volatile components specified in the technical requirements (Section 3.2) for LAVA GC-MS	SOW 2.4.1.2	1	PDR

22	updated design phase project schedule that includes milestone charts depicting critical paths and indicating critical dates in the project	SOW 2.4.1.2	1	PDR
23	Preliminary Design Review Report	SOW 2.4.1.1	1	7 days after PDR
24	Continuation Review Package	SOW 2.4.2	1	7 days before CR
25	Updated documentation from 30% Design Review/PDR (1a – I). Documents shall be presented for approval and baselined.	SOW 2.4.2		CR - NLT 9/15/12
26	Validation and verification plan (1e) to address all requirements in design phase of project, designating the method of verification (test, analysis, design)	SOW 2.4.2	1	CR - NLT 9/15/12
27	Testing data to support design choices and trade-offs	SOW 2.4.2		CR - NLT 9/15/12
28	Operational concept detailed to support analysis modes defined in the technical requirements (Section 3.2 ) for LAVA GC-MS	SOW 2.4.2	1	CR - NLT 9/15/12
29	Preliminary user interface description	SOW 2.4.2	1	CR - NLT 9/15/12
30	Demonstrated GC-MS sampling rate to obtain a full mass spectrum for 1 Th to 65 Th at greater than or equal to 6 Hz	SOW 2.4.2		CR - NLT 9/15/12
31	Continuation Review Report	SOW 2.4.2	1	7 day after CR
32	CDR Presentation Package	SOW 2.4.3.2	1	7 days before CDR
33	Updated functional baseline with trade-off analysis	SOW 2.4.3.2	1	CDR
34	Updated system software functional requirements	SOW 2.4.3.2		CDR
35	Updated risk assessment/mitigation plan and safety analysis	SOW 2.4.3.2	1	CDR
36	Updated test plan for validation and verification of all technical re-quirements listed in Section 3.2 for LAVA GC-MS	SOW 2.4.3.2	1	CDR
37	Updated interface control document	SOW 2.4.3.2	1	CDR
38	Updated project schedule data	SOW 2.4.3.2	14 EA	CDR
39	Updated limited life items list	SOW 2.4.3.2	1	CDR
40	Updated subsystem design specifications for hardware and software	SOW 2.4.3.2	1	CDR
41	Updated mass and power estimates to include the basis of estimation	SOW 2.4.3.2	1	CDR
42	Updated technical plan for high-level and low-level water detection, testing, and optimization of the system for water vapor analysis	SOW 2.4.3.2	1	CDR
43	Updated technical plan for detection of volatile components speci-fied in the requirements (Section 3.2)	SOW 2.4.3.2	1	CDR
44	Demonstration of water detection range and reproducibility on a GC system representative of the contractor's technical approach, including all materials planned for use in the system from injection to detection. Generation of known water concentrations should use a laboratory standard generator or standard salt bath solutions.	SOW 2.4.3.2		CDR
45	Demonstration of permanent gas separations, including hydro-gen/helium separation and thermal conductivity detector (TCD) detection limits for all vapors	SOW 2.4.3.2		CDR
46	Test/analysis/design data to support validation and verification of all technical requirements defined in Section 3.2 for LAVA GC-MS	SOW 2.4.3.2		CDR
47	Software DDS Interface Definition Language Documentation	SOW 2.4.3.2	1	CDR

48	Preliminary programmers guide to DDS interface	SOW 2.4.3.2	1	CDR
49	Report on main-board computer that will be used to run DDS interface	SOW 2.4.3.2	1	CDR
50	Electrical drawings, schematics, and connector pinout, assembly and electrical interface drawings (board level schematics available on request)	SOW 2.4.3.2		CDR
51	Validation and verification plan for hardware checkout	SOW 2.4.3.2	1	CDR
52	Updated project cost estimates for deliverables in Fabrication Phase	SOW 2.4.3.2	1	CDR
53	Critical Design Review Report	SOW 2.4.3.2	1	7 days after CDR
54	<i>Updated</i> fabrication phase project schedule that includes milestone charts depicting critical paths and indicating critical dates in the project	SOW 2.13	1	CDR
55	Data delivery package	SOW 2.5.1	1	NLT 23 months after ATP
56	Full drawing package of “as-built” system, to include a full drawing package of electronics, drawing package of mechanical components, owner’s manuals for OEM items, parts list for all components including part number, manufacturer in-formation, and data sheets	SOW 2.5.1	1	1 month after fab complete per project schedule
57	One to three functional GC-MS systems built to design specifications	SOW 2.5.1		NLT 23 months after ATP
58	Test plans and data taken during build and checkout of the system to include GC chromatograms and MS scans of sample mixtures to demonstrate the system’s ability to meet requirements	SOW 2.5.1		NLT 23 months after ATP
59	Safety documentation The contractor <b>shall</b> perform any safety related analyses necessary to support the safety requirements of Section 4.2. The results of these analyses <b>shall</b> be summarized in a Contractor format Safety Analysis Report that will be provided to the NASA/KSC COTR for review.	SOW 2.5.1	1	NLT 23 months after ATP
60	Operator’s manual, to include instructions for warm-up, calibration, operation, troubleshooting, and shutdown	SOW 2.5.1	1	NLT 23 months after ATP
61	Maintenance manual, to include instructions for replacement of components with an operational limited lifetime (less than 2 years)	SOW 2.5.1	1	NLT 23 months after ATP
62				
63	Long lead items list to include estimated lead time and vendor quotes for components with an estimated lead time over 3 months	SOW 2.5.1	1	
64	Interface Control Document	SOW 2.10	1	CDR
65	interface drawing package	SOW 2.9	1	CDR
66	Models used in the design analysis and performance of the below analyses or used for CAD/CAM/CAE in a file format compatible with CREO/Pro-E Wildfire 5	SOW 2.9		NLT 23 months after ATP
67	Communication and Control Specification Document (CCSD)	SOW 2.10	1	NLT 23 months after ATP
68	Structural Analyses Report	SOW 2.12	1	NLT 23 months after ATP
69	Fabrication, Assembly, and Inspection Flow plan	SOW 2.5.2	1	CDR
70	Spare thermal conductivity detectors	SOW 2.14	2 for each instrument	NLT 23 months after ATP

71	1,000 centimeters of each type wire it has used in fabricating the GC-MS	SOW 2.14	1000 cm of each wire type	NLT 23 months after ATP
72	Spare mass spectrometer detectors for each GC-MS instrument	SOW 2.14	2 for each instrument	NLT 23 months after ATP
73	ionization sources for each source installed in the GC-MS instrument	SOW 2.14	2 for each instrument	NLT 23 months after ATP
74	Spare connectors, pins, and sockets	SOW 2.14	1 complete set	NLT 23 months after ATP
	spare gas chromatography column	SOW 2.14	1 for each installed in instrument	NLT 23 months after ATP
	Spare high voltage power supply	SOW 2.14	1 for each instrument	NLT 23 months after ATP
75	Other parts the vendor deems necessary to repair the GC-MS instrument	SOW 2.14	ea	NLT 23 months after ATP
76	GC-MS Test Plan for the verification tests	SOW 2.4.3.2; 3.2	1	CDR
77	Verification Test Procedures	SOW 3.3		1 month prior to testing
78	Verification Test Reports	SOW 3.5		2 weeks after testing is performed
79	Quality Management System Plan	SOW 4.1.1	1	PDR
80	Schedule / Inspection Control Point Outline (ICPO)	SOW 4.7.1	1	CDR
81	Acceptance Data Package	SOW 4.7.4	3	NLT 23 months after ATP
82	Verification matrix	SOW 3.1	1	CDR
83	Test Printed Wiring Board (PWB) coupons	SOW 4.8.1		When procured as specified in project plan
84	A preliminary Bill of Materials of all components specified in the design of the system. As a minimum, the Bill of Materials shall provide the item description, manufacturer's part number, lead time for procurement, supplier, supplier's part number, and component designator (if applicable).	SOW 2.4.3.2	1	CDR

**NNK12427490R AMENDMENT 1 Vacuum Development Unit (VDU) Gas Chromatograph-Mass Spectrometer (GC-MS)**

Question Number	Section	Question/Comment	Response
1	Specification (3.2.13.1 and 3.2.13.2)	Sections 3.2.13.1 and 3.2.13.2 of Attachment B are inconsistent. 3.2.13.1 states that the maximum overall volume can be only 18,000,000 cubic millimeters and 3.2.13.2 states that the maximum dimensions can be 250x250x175 mm (which is approximately 11,000,000 cubic millimeters). Can you clarify which volume is the maximum allowable?	3.2.13.1 is a requirement for a volume, 3.2.13.2 is a goal (no shall statement, rather a should statement), it is intended to capture our goal size but not be included as a requirement for the instrument
2	Specification (4.2.1.3)	In section 4.2.1.3 of Attachment B, there seems to be a missing equation. Can you provide that?	$R = \frac{2[(t_R)_B - (t_R)_A]}{W_A + W_B}$
3	Specification	In all places in Attachment B where there is a statement “±(XXX ppm absolute + YY% of reading)” where XXX and YY are numbers, can we assume that you mean “±(XXX ppm absolute or YY% of reading, whichever is greater)”?	No, it is not an 'or' statement, the accuracy requirements combine relative and absolute accuracy.
4	RFP and DILS	The Base Contract CLINs (e.g. Design Phase and Build Phase progress reports) and Attachment C (e.g. Items 1 and 2) imply that the schedule is expected to be a 24 month project. Yet, Attachment C also implies that the build phase will be completed within 12 months of the contract start date (e.g. Item 57 requests delivery of 1-3 GC-MS systems built to design specifications NLT 7/15/2013 [assuming a 7/1/2012 start date]). Can you clarify the expected timing for the design and build phases?	Deliverable list modified for new date of hardware delivery NLT 23 months after ATP
5	RFP and DILS	Section B.3 Milestone Payment Schedule implies a 10 month Design Phase and a 14 month Build Phase. Assuming a July 1, 2012 ATP, Section B.3 appears to be in conflict with the Deliverable Items Milestones for deliveries NLT 7/15/13. Is this an error and would a proposal that included a 10 month Design Phase and 14 month Build Phase be considered responsive to the solicitation?	Deliverable list modified for new date of hardware delivery NLT 23 months after ATP
6	Specification (3.2.8.2)	Will RESOLVE provide a continuous pressure measurement to ensure safe operation of the mass spectrometer and high voltage electronics?	RESOLVE will not monitor or measure the ambient pressure of the system, however safety concerns can be mitigated operationally (i.e. the system will not be turned on until the Vacuum Chamber pressure is at an acceptable level).

7	Specification (4.2.1)	To reliably quantify gases from 0.1% to 99% a calibration gas will be needed. Will the calibration gas be provided or will this have to be part of the proposed instrument?	The calibration gas used to show that the instrument performs to specification, prior to delivery of the instrument is the vendor's responsibility. The calibration gas must be delivered to the instrument, however it is considered supporting test equipment and is for the vendor's use only to verify the performance of the instrument. The vendor will not deliver the calibration gas to NASA as a part of the delivery package. When the instrument is integrated and tested at NASA/KSC, NASA will use NASA calibration gas. This statement was intended to clarify that the typical 'internal calibration gas' that will be included in the integrated RESOLVE system will not be a responsibility of the vendor and should not be included in the design package of their instrument.
8	RFP Sections B and L	Some elements of the instrument will require R&D to advance the current state-of-the-art and meet technical requirements of this RFP. A Fixed Price Proposal with the milestone payments schedule described in Section B.3 is not suitable to this type of effort and creates unacceptable risk for our team. Will the offerer consider restructuring the RFP to cost reimbursable according to earned value?	Based on the questions received to date, as well as the responses to the sources sought synopsis issued by Kennedy Space Center (KSC) in January of 2012, and due to budgetary constraints, KSC has reason to believe that the existing knowledge, skills and technologies in the areas of Gas Chromatography and Mass Spectrometry, will allow for potential offerors to meet NASA requirement to advance the current state-of-the-art on a fixed price basis. The schedule includes a progressive milestone plan utilized in similar NASA fixed priced acquisitions to facilitate the understanding of requirements.